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CITIES OF MEXICO: OAXACA

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Many Mexican cities are located in basins or valleys surrounded by mountains. Oaxaca is a valley city. The smooth macadam highway which extends southeastward from Puebla for 257 miles curves around the top of a high hill and there, about five hundred feet below, is a large cluster of buildings, their green and red tile roofs and white, pink, blue, and yellow walls gleaming in the bright sunlight. Here and there a dark green patch indicates a plaza usually marked by the dome of a church facing it on one side.

LOCATION

Oaxaca is really at a junction point where three valleys meet. As one stands on the hillside facing the city he can see the Etla valley stretching back toward the northwest on his right. To the left is the valley of Tlacolula coming up from the southeast. Southward, as far as the eye can see, is the valley of Zimatlán. A stream flows down the Etla valley and another from the Tlacolula joining close to Oaxaca and then continuing southward toward Zimatlán. This stream is known as Río Atoyac, but where it empties into the Pacific, more than 169 miles distant via its channel, the river bears the name of Río Verde. The Atoyac River is the most important in the state of Oaxaca. However, the state of Oaxaca encompasses a large portion of the Mesa del Sur. The Atoyac drains the central portion of the state. On the northwest the drainage is toward Río Balsas which flows to the Pacific Ocean thru the state of Guerrero. On the north and northeast surface waters flow toward the Gulf of Mexico, while on the southeast the Tehuantepec River carries excess water to the Gulf of Tehuantepec.

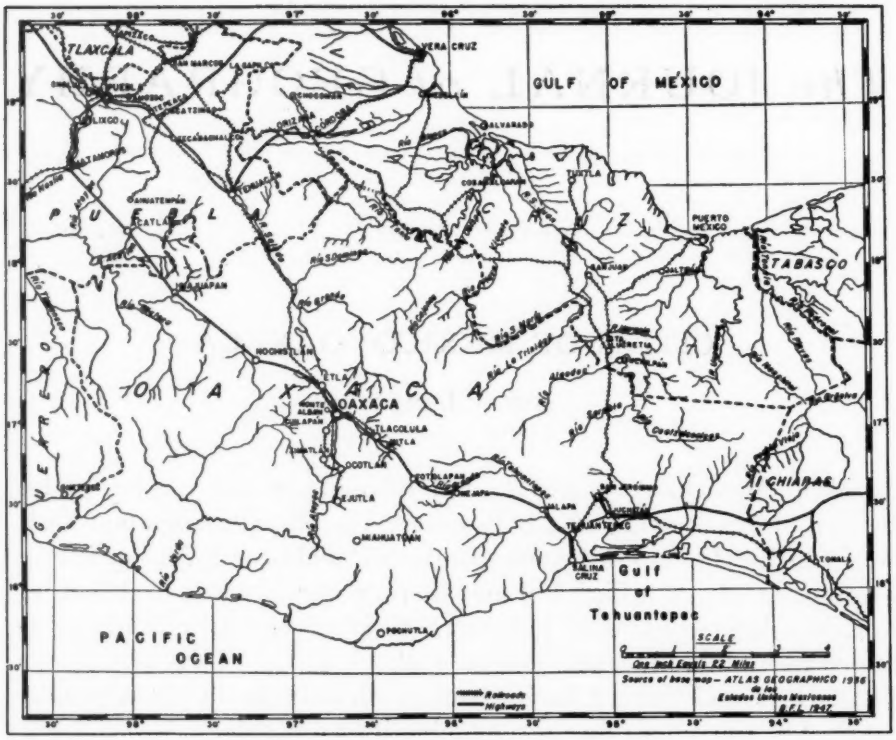

FIG. 1. Map of the Oaxaca region.

LOCATIONAL INFLUENCES

A geographer, looking down at the city of Oaxaca naturally thinks about the reasons for its location. The city has been there for centuries, long before the days of Benito Juárez in whose memory the monument on the other side of the road at the observation point was erected. Benito Juárez was born in a little town named San Pablo Guelatao, state of Oaxaca, in 1806. Since he is said to have been a pure Zapotec Indian, and became the most outstanding figure the state of Oaxaca ever produced, its citizens, the Zapotecs and the Mixtecs, spend a good deal of their time celebrating his exploits.

The city of Oaxaca was in its present location before Juárez appeared. The Spaniards founded the town four centuries ago and called it Antequera. Cortes owned all the land about it for a radius of about fifty miles. His vast estates remained almost intact up to the beginning of the 19th century.

It is possible to go farther back in history to explain the present

existence of the city. At the time of the coming of the Spaniards the Mixtecs and the Zapotecs had already developed a culture that compared favorably with that of the Aztecs. They erected buildings, moved great masses of stone long distances, carved it into intricate designs, worked with silver, copper, and gold, manufactured beautiful objects for human adornment, wove cloth, and made

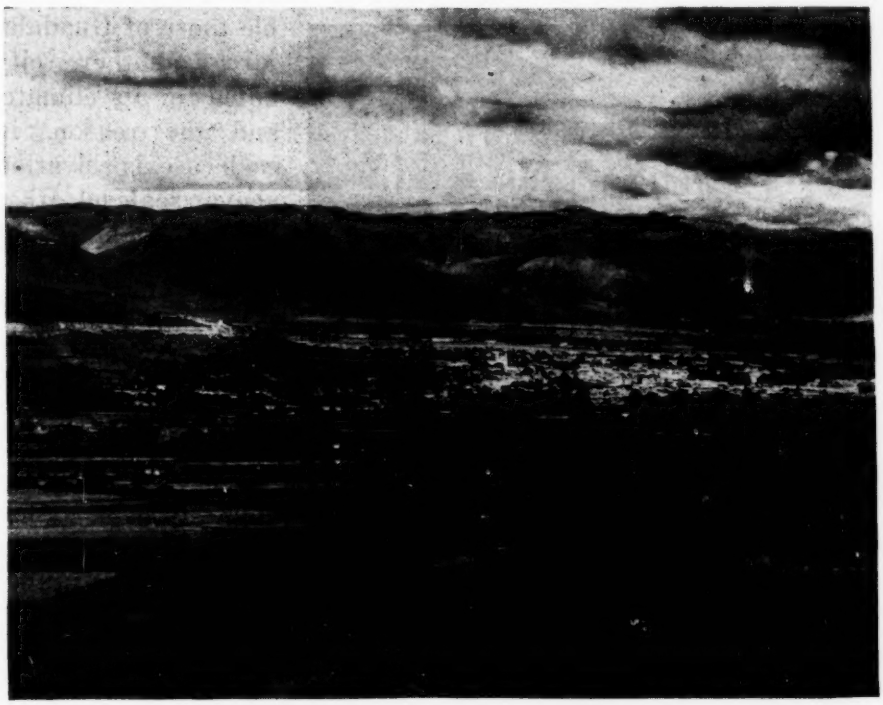

FIG. 2. Oaxaca is located close to the junction of two streams which form the RíoOtoyac. High mountains border the valley.

pottery, besides carrying on the occupations of the agriculturist. When all this is considered, the realization develops that people have lived in those valleys for a long, long time. What, besides the human factor, made this possible?

CLIMATE

Oaxaca is about 17° north of the Equator, hence it receives vertical rays of the sun twice annually, and every day in the year those rays are pretty steep, bringing a lot of radiant energy from the sun. The city is in a valley and a mountainous area about 100 miles wide separates it from the Pacific Ocean to the south. If

Oaxaca were located at sea-level its daily temperature would be high with little annual fluctuation. However, the average summer maximum is 71.5° Fahrenheit while the minimum average during winter is 62°. The air is always comfortably cool in the shade, the nights are wonderful, and the only excessive temperature is experienced when one stands in the bright midday sunlight. Oaxaca's temperatures resemble those of Guadalajara, another city noted for its climate, and the reason, in each case, is elevation above sealevel, that of Oaxaca being 5071 feet.

FIG. 3. Arches cover the streets on three sides of the Zócalo.

Since the valleys constituting the Oaxaca city area are hemmed in by mountains, heavy rainfall is not to be expected unless the location were one that was constantly subjected to low pressure areas with their masses of rising air. About 150 miles of mountainous country intervene between Oaxaca and the Gulf of Mexico. During the winter months the air movement should be from the northeast and most of the moisture picked up from the warm waters of the Gulf would be left on the windward sides of mountains long before the air reached the city. In summer the thermal equator is not far from Oaxaca and masses of warm, stagnant air are likely to occur in its vicinity. Oaxaca receives most of its annual precipitation of 25 inches during the summer. The cause of this rainfall must be due, in large part, to convectional movements in the warm air masses. Along most of the route from Puebla forests cover the eastward slopes of mountains whose western sides are barren or support some form of xerophytic vegetation. Most of the basin and valley farming is aided by irrigation water from mountain streams. Much of the 25 inches of summer rainfall evaporates beneath the strong rays of the sun. During the summer of 1946

Oaxaca experienced considerable drought, enough to cause city water to be turned off from three in the afternoon until seven each morning in order that sufficient water might collect in the reservoir to take care of the bare needs of the citizens. Electricity was regulated, users being permitted to apply current to their work only during specified hours. Corn, the great staple crop of the area, generally receives enough rainfall for its cultivation, but wheat, sugar cane, and rice require irrigation. The climate of Oaxaca permits both temperate zone crops and those of the tropics, the former during winter, the latter during summer. The climate is classified as subhumid mesothermal with rainfall deficient in winter. Subhumid regions usually experience much irregularity in their receipt of precipitation.

FIG. 4. A street scene at one end of the Zócalo.

HUMAN ACTIVITIES

There are 33,423 people in Oaxaca and many more in the surrounding region because those valleys, with their alluvial soil washed down from the mountains, the mild temperatures, the rainfall and available irrigation water permit man to produce a wide variety of crops and find forage for cattle, sheep, goats, and hogs. Grain, sugar, and fruit require handling, some processing, some manufacturing, and transportation before they pass to the consumer thru retail channels. Liquors can be made from the grain and the sugar cane. Sugar is the chief product from the cane. Hides and skins become harness, shoes, bags, and upholstery for furniture, while the wool of the sheep and the hair of the goats can be made into textiles. Clay is manufactured into pottery, and charcoal and lumber comes from the mountain forests. Not much power is needed

for any of these industries so the citizens are not badly handicapped by their lack of coal. The state of Oaxaca may be rich in minerals but there is very little development at present.

Accessibility

The Pan American highway now affords a smooth pavement between Mexico City, Puebla, and Oaxaca, but east of the city there is no land transportation other than the pack carriers, the burros, and the ox cart. The Pan American highway has been graded to the isthmus of Tehuantepec and beyond but is still practically impassable for automobiles and trucks. This route, when finished, will give Oaxaca its only land connection with the Pacific, via the port of Salina Cruz. Oaxaca has long had railroad connection with Mexico City and Vera Cruz by way of Techuacán and Puebla, but Mexican railroads are not dependable nor are their methods in the least efficient. Nevertheless, this has been the city's only connection with the rest of the country. Oaxaca does have an airport with service to Acapulco, Tehuacán, Mexio City, and Tapachula, but there is never any assurance the Mexico City-Tapachula planes will let the passenger off at Oaxaca, or when they will bring him back from some airport to which they have decided to take him. Oaxaca's best hope for a valuable transportation route is the completion of the Pan American highway.

The City

The good macadam road descends abruptly from the hillside overlooking the city, into the town itself and there the traveler suddenly realizes he is no longer upon a government-built highway. The streets of Oaxaca, like those of most Mexican cities, were paved once and nothing has ever been done in the way of repairs. The same can be said of the streets of Atlixco, the first city enroute south from Puebla, and of Matamoros, another city farther on. The driver of a car which passes thru such towns finds himself continually faced with a decision as to which hole will damage his car the least. Mexican city streets like every other object they build, may have been good once, but having completed something that looked nice, the builders never afterward did anything to prevent them from becoming ruins. The Mexicans construct buildings with poor, flimsy materials and cover them with stucco and ornaments which make them appear attractive. As time passes they fall apart

or an earthquake shakes them down. Oaxaca was almost destroyed by an earthquake in 1931 and for years afterwards no buildings of more than one or two stories were erected. Now, with the possibility that a lot of American tourists will bring their wealth down the new highway, hotels are adding several stories. As one watches the sun-baked bricks being packed around wooden beams or thin pieces of steel and the whole covered with a heavy layer of cement he wonders about the awful crash that might follow one of the frequent and ever-to-be expected ground tremors.

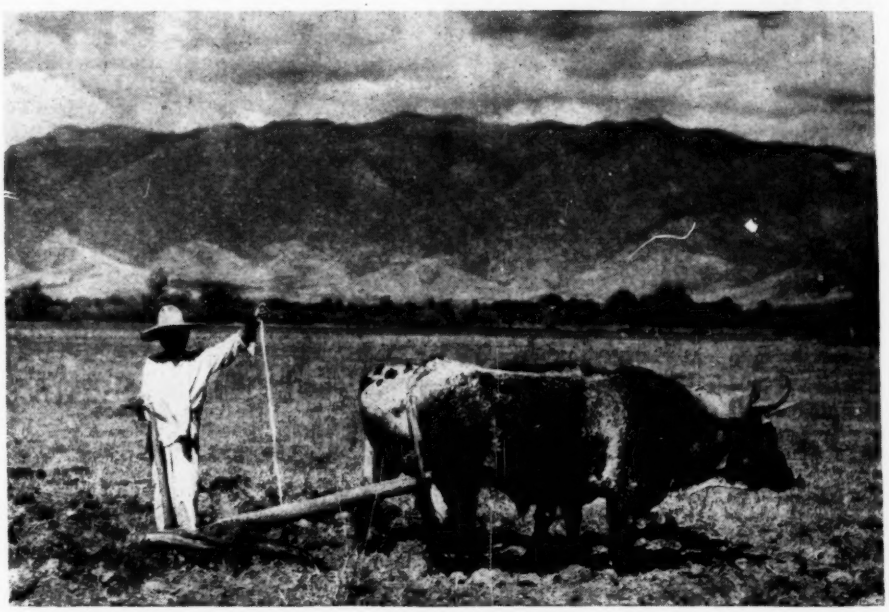

FIG. 5. A farmer plowing his land in the Etla Valley.

The streets of Oaxaca are similar to those of other Mexican cities in appearance except a number of the buildings are faced with a greenish stone. The houses are flush with the narrow sidewalks and, where doors are open one may catch a glimpse of patios with their tiled floors, stone benches, many flowering plants, and usually several cages of birds. Few stores are in any way modern. Except in the largest Mexican cities, the merchants do not yet seem to consider that store fixtures or arrangement of merchandise have any bearing upon the volume of business. Perhaps they do not have much influence if the customers do not like much foreign atmos-

phere. The large markets are usually filthy so why expect cleanliness in the small store.

Oaxaca has several plazas, some poorly kept, others passable, but the large central plaza which they call the Zócalo is as beautiful as any the author has seen in Mexico. Nothing that has been written heretofore seems to apply to that plaza. The bandstand in the center

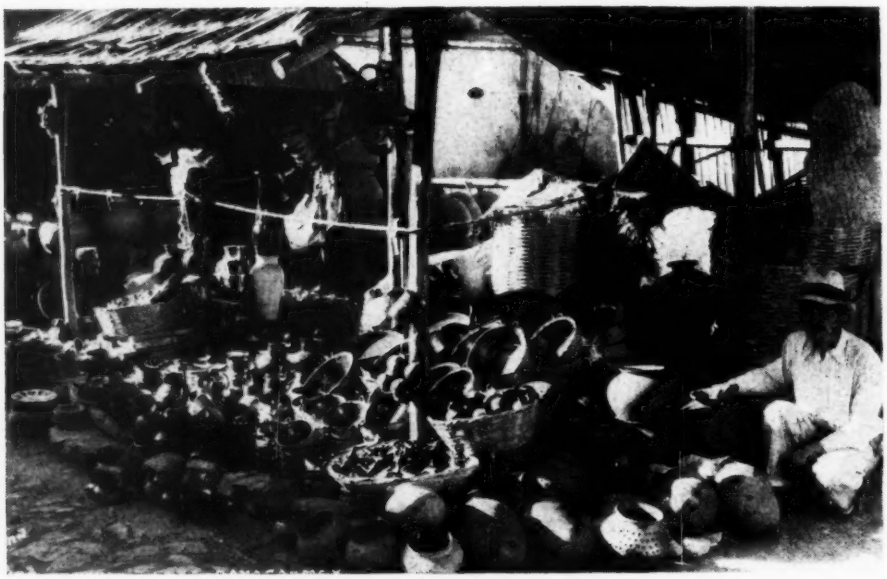

Fig. 6. A pottery market.

is painted, and each night it is used by a fairly capable band. The walks are of tile, wide and clean, the flower beds well-tended. Numerous seats of granite inlaid with red tile, and granite lamp posts similarly decorated add beauty to the place. Many people wander thru the Zócalo in the mornings, it is almost deserted during the siesta period, but afterward every seat will be occupied, while groups of people promenade along the walks. The cafe tables under the arches on two sides of the Zócalo are all in use and every one seems to be having a good time. By midnight the crowd has disappeared and the lights are dimmed, but the beauty still remains to be enjoyed another night and perhaps, all the other nights that are to come.

A Tourist Center

Besides turning out products of the handicraft trades and buy-

ing and selling of commodities produced in the region, Oaxaca is a tourist town. Seven miles away by good road are the ruins of Monte Albán where a large amount of ancient Indian treasure was discovered. Twenty-eight miles southeast of Oaxaca via what is yet a very poor road are the ruins of Mitla, the tombs of the Zapotecs. Many people come to Oaxaca thruout the year to visit these ruins and observe the treasures which are on display in the museum. All of this is well worth a trip to Oaxaca but, as the tourists gasp at the skill of people who lived hundreds of years ago and wonder how they ever made such things, one might ask them to think of their own ancestors and the skills they possessed. Even today there are many Americans who, given a knife, a chisel, a mallet and something that will saw, can create beautiful things. Man can still do such work if he has time and patience, and the creators of the Oaxaca treasures had plenty of both. Of course I do not know of anyone who can fashion a flawless, symmetrical urn four and one-half inches high, three inches in diameter, with a sidewall thickness of two-fifths of an inch, from such material as rock crystal, even with modern tools. Neither do I know what kind of tools the Zapotec or Mixtec Indian used. That urn might have been the only thing he produced during his lifetime. It is not how fast erosion takes place but the period of time involved that wears mountains down to peneplains.

Oaxaca is worth visiting. It has nice hotels where the guest may enjoy good rooms and food for from four to six dollars a day, and it does not cost anything to sit for hours in that beautiful plaza and watch the people go by. However, even the best hotels may find themselves without water for washing for two days at a time during which the tourists may be observed looking very intently at the gold fish in the plaza pools.

HOMES AND HOMESITES IN SELECTED AREAS OF EASTERN ASIA

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In Eastern Asia most of the people live in small low houses, which, in the moister regions, have the floor a foot, or possibly several feet, above the ground. The type of construction, in most cases, reflects the availability (or paucity) of local construction materials. A home, out of necessity, must be constructed easily and cheaply, either by the owner and his family or by, at most, a few local artisans. In general, climate does not necessitate a substantial structure, and aesthetic preference must be replaced by economy and simplicity. Drab unpainted buildings, rather than colorful or picturesque homes, predominate.

THE PHILLIPINES

Filipino homes range from the square, one-room huts of nipa palm leaves, bamboo, or cogon grass to the substantial, palatial structures of reinforced concrete or stone in the superior residential districts of Manila. The former, particularly those of nipa or suali construction, predominate in the rural areas and in the smaller settlements where ample materials are available and each youth can thus build his own house. Bamboo is used for posts, beams, rafters, and sometimes siding. Fronds of the nipa or suali palm, or sometimes cogon grass, furnish thatching for the roof and in some cases a covering for the outer walls. All parts are tied and bound with rattan or bamboo strips. This type of house may stand on piles three or four feet above the ground, thus allowing air to circulate freely beneath and providing a shelter for domestic animals. If not on piles, the nipa hut may have only an earthen floor.

Altho more typical of rural districts, each city or large town has a native village section composed of closely spaced nipa huts which front on narrow streets and in the dryer season constitute a serious fire hazard. The Tondo District of Manila (north of the port area), sometimes called Manila's slum area, exemplifies this congestion. Likewise, palatial homes are not confined to metropolitan Manila, as many provincial districts, especially the sugar areas of Negros and Panay, have elaborate residences owned by wealthy planters.

Between these two extremes are the middle-class homes—the so-called *mestizo* houses and the smaller, but more modern concrete or stone structures of modified-Spanish style. The latter surround the central plaza (public square) of each provincial capital or other regional center. The "mestizo" house is somewhat more substantial than the nipa hut and may have a tile or corregated-iron roof, a wooden floor or walls, and a small compound surrounded by a bamboo fence. It is used in most of the cities and towns and in scattered rural areas.

Less prevalent types of homes reflect the immediate environment and economy, or the impact of foreign cultures. In some of the coastal communities of Mindanao, the nipa shacks are built above the shallow coastal waters and boats are tied to the pile foundations. In Lanao Province, Mindanao, there are wooden homes with curved roofs typical of Chinese architecture, and boat-shaped houses that resemble Chinese junks. The primitive mountain settlements of Northern Luzon consist of low, one-room cogon grass huts of diverse architecture. The Spanish influence is reflected in the old stone buildings of Manila's *Intramuros* and in newer frame homes constructed on high walls of brick or adobe; in each case tile roofs predominate. Mission settlements and mining communities may have some living quarters of galvanized iron. Finally, scattered bungalows, usually in urban areas, reflect American influence on home building. Adaptation of foreign ideas, however, is the exception rather than the rule, and the easily-constructed nipa hut which is well suited to the climate and to the customs and habits of the population, remains the typical Filipino home.

China Coast

The area between the Yangtze Delta and the Canton region is markedly similar in many respects, and living facilities are no exception. Brick side and rear walls, wooden fronts, and tile roofs predominate thruout the coastal area. However, there are local variations and Amoy (Hsia-men), Foochow (Min-hou) and Wenchow (Yen-chia) have been chosen to illustrate local deviations and modifications.

In and near Amoy the majority of the people live in small one- or two-story houses with the brick walls plastered both inside and out. The wooden front is oftentimes carved and varnished. Almost without exception roofs are of tile, with projecting eaves in front

and back. Windows are small and sometimes barred. The native shops of similar construction have swinging wooden doors giving access to the display room. The shop owner and his family live at the rear of the shop. In Amoy about 10,000 persons (prewar figure) live in houseboats on the waters in and around the city.

In the city of Foochow, most houses are also one or two stories in height and are built of Chinese brick held together by inferior mortar, mostly mud. Because of the moist climate, lime mortar is plastered on the outside as waterproofing. The ground floor is of tile or pounded earth and the upper floor of wood; roofs are tiled. The majority of the houses have no veranda, but the homes of the occidentals and wealthy Chinese on Nantai Island (in the Min River) have porches on all sides. The poorer homes are made of pounded earth, plaster-covered bamboo laths, stone, or infrequently wood. The numerous small shops have wooden fronts with sliding boards or panels which are removed during the day and replaced at night. In Foochow, as in Amoy, thousands of people live in rows of closely packed boats on the Min River.

Houses in the Wenchow area differ more radically from the conventional pattern of homes on the China Coast. The majority of the inhabitants live in small dwelling units within walled compounds. The buildings are constructed of good brick masonry with solid foundations. People of all classes live in these compounds, altho the compound of a wealthy family may have several courtyards instead of a single enclosed yard. The main building, which contains the guest room, master bedroom, and dining room is at the far side of the enclosure and facing the covered entranceway. A home for the owner's parents is usually on the left of the entrance; opposite it on the right are the kitchen and servants' quarters.

FORMOSA

Formosan homes are of three types: Chinese, Japanese, and native. With a few exceptions the Japanese houses are entirely within the cities and towns and the native dwellings largely in rural areas, whereas the Chinese may live in either urban or rural surroundings. In Japanese urban districts the smaller homes are closely spaced or adjoining units of brick walls upon a wooden frame. The chief difference between these solid residential blocks and the commercial districts is the height of the structures as two-

story buildings predominate in the commercial areas. The wealthier Nipponese have frame houses in spacious gardens, similar to the better homes of southern Japan. In a few instances western-style architecture is used. Chinese urban districts consist of narrow irregular unpaved streets lined with dwelling units of brick or light wood, roofed with tile or bamboo and thatch.

Formosa is dominately agricultural, so rural homes predominate. In areas of hilly terrain they may be isolated units, but elsewhere the hamlet is more prevalent. An individual hamlet normally consists of four to ten units facing a common courtyard. Construction varies from mud or pounded earthen walls with thatched roofs to brick buildings with tile roofs, patterned after those of the China Coast. There are occasional light frame structures of diverse style. Most houses have a few low windows, wooden doors, and an earthen floor.

The 150,000 aborigines in the more rugged eastern half of the island live in thatched stone huts or in cane or bamboo cabins.

Japan

Whereas the Chinese have used principally brick, clay or stone, the Japanese have consistently constructed their homes of wood. This results, in part, from the greater timber resources in Japan, but is also the result of a Japanese preference for wood because of its greater artistic possibilities. This artistic preference, however, does not include bright colors and the use of various paints and varnishes. Instead, the exterior, particularly the front, of Japanese homes has a darker appearance from outdoor weathering and the interior a richer color obtained by hand rubbing the surface of the wood. The outer, stationary walls are oftentimes made of mud plaster with rice straw serving as a binder. White lime plaster, fine sand, or clay may be used as a final finishing coat. The thatched roofs have steep slopes to facilitate rapid run off of the heavy rains. Wide eaves serve to protect the open rooms from the more extreme weather elements and also permit the owner to hang grain or vegetables under the eaves to dry. Houses, if possible, face the south to take full advantage of the prevailing winds in the summer months and to receive maximum insolation during the cooler season. The artistic front is really a set of sliding panels on either side of a narrow veranda; the inner panel forming the wall of the house proper. Paper or glass in these panels are probably the only source

of natural light, except when the panels themselves are open to permit ventilation or direct sunlight.[1]

Rural homes may show greater variation in detail, yet they remain quite similar. They are small, rectangular, one-story, three to five room structures, with the former size much more prevalent. They are cheaply constructed and, by American standards, quite fragile. Wooden posts, oftentimes unsawed timber, form the framework. Each cornerpost rests upon a large stone as a foundation. The floor is at least a foot off the ground, thus the free passage of air below the floor retards excessive dampness. Thatch and tile are the principal roofing materials. In southern Kyushu the thickly thatched rural houses present the appearance of tropical huts and individual yards may be walled by mud, stone or bamboo fences. On the plains of Hokkaido farmhouses are more sturdy log or clapboard cabins and offer much better protection from winter cold than do the thin-walled homes of subtropical Japan. To a large extent, wooden shingles or galvanized iron, have replaced thatch and tile as the dominant roofing material. This somewhat sturdy construction probably results in part from the greater severity of the winters in Hokkaido, but also reflects the greater western influence in Japan by the time of agricultural settlement in Hokkaido. Even so, however, these homes do not depart radically from those of Old Japan.

Urban homes are not markedly different from rural construction. One-story homes are still more prevalent, but there is a higher percentage of two or even three-story buildings. Because of the fire hazard, thatched roofs are less common, tile and galvanized iron more prevalent than in rural areas. In the combination home and shop, the sales or work room opens on the street and the living quarters are in the rear or on a second floor. The homes of the more wealthy residents are not only larger but are set back from the street and separated from it by a high wall of pickets or shrubbery. The more spacious surroundings permit the superior residence to be centered within a beautifully landscaped garden. The better homes of southern Kyushu are normally two-stories and reflect the Chinese influence more than do those of the northern areas.

[1] For greater detail on Japanese houses see, Trewartha, G. T., *Japan, A Physical, Cultural, and Regional Geography*, The Univ. of Wisconsin Press, 1945, pp. 185-192, from which portions of this section have been adapted.

Ryukyu Islands

The houses of the upper class in the Ryukyu Islands are similar in architecture to those in Japan proper. Most of them are one-story dwellings of frame construction with floor mats and sliding paper screens. Red tile roofs predominate, but thatch is also used. In Okinawa Gunto and Sakishima Gunto, protection against the frequent high winds is provided by stone walls, bamboo groves, or other wind-breaks. Dwellings are not as closely spaced as in Japan. Some are rectangular, others more nearly L-shaped. Some have a separate shed-like roof at one end which shelters an open porch.

The houses of the poorer classes in the Ryukyu Islands are more primitive and less substantial, easily destroyed by storms, but easily rebuilt afterwards. The walls consist of bamboo screens between which are packed about six inches of straw. A two-foot gap in these walls serves as an entrance. Roofs are supported by four corner uprights about five feet high, and are covered by thick thatch. These houses have no floors other than mats spread upon the ground.

Bonin Islands

Most of the inhabitants of the Bonin Islands live in small, unpainted, frame dwellings with a neglected general appearance. These single-story, square or rectangular units are built about a foot above the ground, in most cases with sliding paper panels similar to those of Japanese houses. Roofing materials include thatch, shingles, and corrugated iron. Some of the buildings are without windows; others have windows only at the ends.

The few descendants of the early occidental settlers live in simple, painted, frame western-style homes. The bedroom is under the main roof ridge; the kitchen has a separate roof ridge. These homes have more windows than the unpainted dwellings of the Japanese inhabitants.

PROFIT FROM A CROP OF TREES

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This is a story of a man who grew a crop of trees and received from them a return comparable with that which farmers in more fertile lands receive for growing the usual crops. I believe the story may be of use to those of us who are preaching conservation, since it is an example of worthwhile cash reward during the lifetime of the man who planted the crop of trees.

Some twenty-two years ago William Cribbs began planting pine trees on his land in Kalkaska County in the northern part of the Lower Peninsula of Michigan. Eventually he set out a total of eighty-five acres.

A couple of summers ago sparks from a train set a fire in the planting which burned over thirty-three acres on which were 21,000 trees varying in age from three to twenty years. There were twenty-year trees on twelve of the acres burned over.

In settlement of damages the railroad company considered $15,000 a just appraisal. They offered Mr. Cribbs that amount together with $500 for cleaning up the mess. This he accepted. If he had at once salvaged the timber he would have had for sale some 15,000 feet of pine finish lumber beside poles which are in considerable demand for summer cottage construction.*

Thus Mr. Cribbs obtained, principally from his twelve acres of twenty-year-old pine, a return of $15,500 and would have obtained a few thousand more had he beaten the worms to the deadened timber. Beside, Mr. Cribbs had, for some years, an active Christmas-tree business and I presume he had sold a good many trees from those burned-out acres. The return for his crop averaged not far from $1,000 per acre, or some $50 per acre per year.

I wonder how many farmers in any part of Michigan or even in Iowa have grossed $50 per acre per year growing corn or hay or oats all during the 1922-1945 period. And if any of them did, I wonder if any of them had as much fun as Mr. Cribbs did in planting the crop and in watching it grow. But I am not in doubt as to who had to cultivate the land the more, nor as to who had the higher costs. The same experience could have occurred most any

* Information directly from William Cribbs, Ionia, Michigan.

place in Michigan for pine trees do not grow appreciably better in Kalkaska County than in others farther southward. It could have been also in Wisconsin or Minnesota or several other places. The return he received must have been about what might be expected from a similar forest elsewhere since the Pennsylvania Railway Company doesn't make a practice of paying more than the value of the things destroyed.

I am bringing this story to you as one of a type that we who are teaching conservation may well collect. We may strongly advise tree planting on private lands but our advice will have little affect unless we can cite examples of profits from planting and growing trees. Mr. Cribbs' experience was unusual, in that his trees burned. It was unusual also in that he was paid for trees burned. Yet frequently when I tell this story to a conservation audience I am told of money from crops of timber that exceed Mr. Cribbs return.

There are several products salable from plantings of pine trees. The earliest is Christmas-trees. They are ready in some five to eight or ten years. Christmas-tree thinning has yielded more than $100 per acre. Probably the next is poles, six to eight inches in diameter at the base, for use in summer cottages. They normally are ready in twenty to twenty-five years. Next is a lumber crop. Now that lumber is scarce it is being cut from eight to ten inch sticks. Pulp wood also is available at the pole-small-lumber size.

These could be harvested by the person who plants the trees. The real lumber harvest would be mostly in the hands of the second and all succeeding generations.

But it can be summed up briefly: There is money in planting trees.

THE AIR AGE: FACT OR FANTASY?

An Evaluation of the Global Air Transportation Pattern

G. Etzel Pearcy
Trans World Airline

To most people in the United States the term *Air Age* carries a meaning of glamor. School children use the term glibly in their studies of how the airplane has changed and is changing the American way of life. Books, magazines, and newspapers employ the term in revealing the latest inventions and techniques in the aeronautical world. "Air Age" educators are quick to point out the tremendous savings in mileage to be saved by flying over polar regions from one continent to another. All of these interesting highlights dealing with the role of aircraft in the modern world are quite valid—yet their very glamor and appeal tend to hide the more conservative and less spectacular, but more potent phases of our real advance in air transportation.

No Passengers on Rocket Ships

Over-the-pole flights, supersonic speeds, rocket ships, 300-passenger planes, and other wonders of aviation look good in *Popular Mechanics,* Sunday supplements, and comic books. But the average citizen cannot at the present time travel 750 miles per hour or buy a ticket to the moon. He can, however, do many things which a generation, or even a decade, ago would have been thought impossible. Certainly one logical version of the Air Age may deal realistically with what *actually has taken place* thruout the world and what the traveling public *can count on as fact.* In other words, it is worthwhile taking inventory of what we can do today rather than what we may expect to do in the years to come. Perhaps a few noteworthy points and critical dates in the history of global flying can best illustrate the Air Age of Fact as distinguished from the Air Age of Fantasy.

Prewar Air Pattern

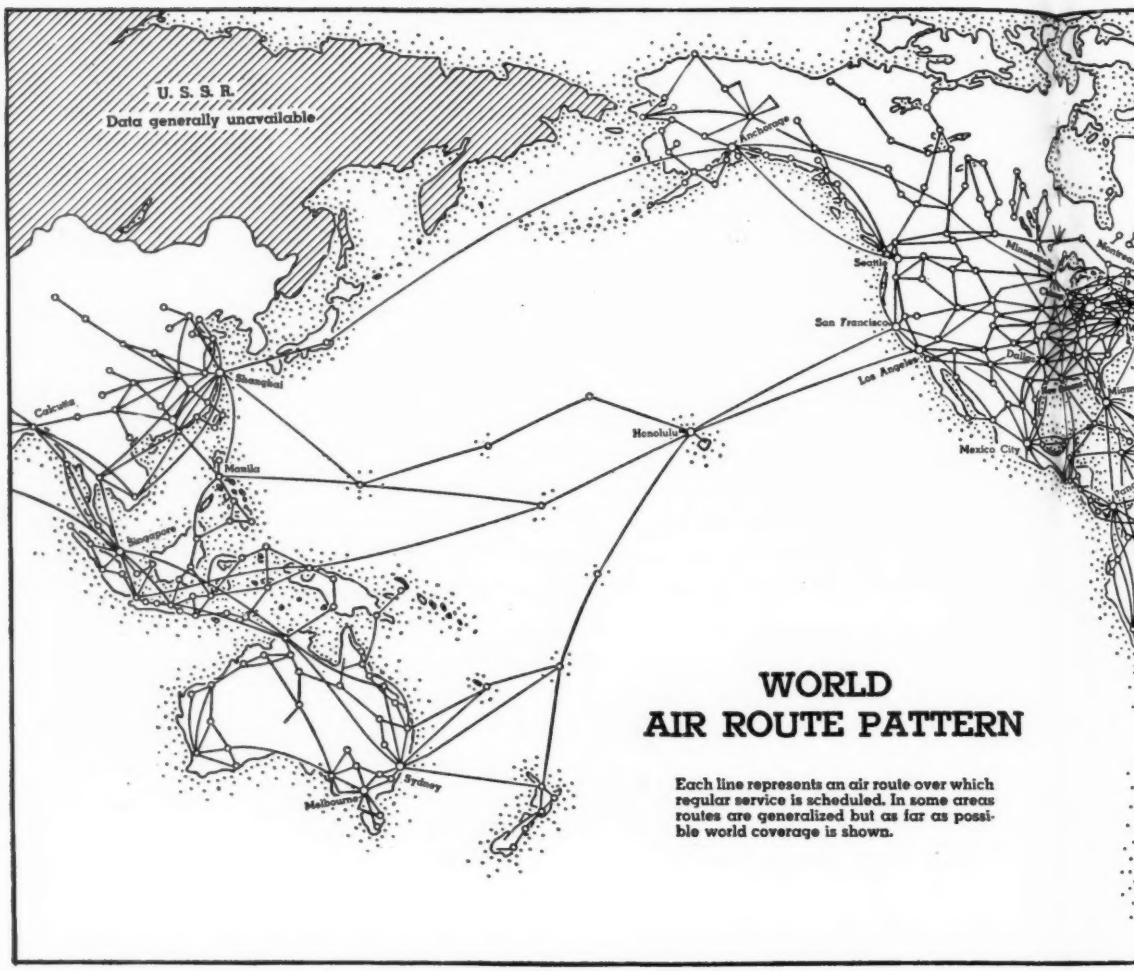
On the eve of World War II air transportation on a global scale was in the making, but at that time it was definitely not a reality in the true sense of the word. However, over many of the land areas of the world and over short water distances the route structure was

well established. A cycle of development had been completed whereby each continent built up its own pattern of air routes. Long-distance intercontinental routes, including trans-ocean segments, were for the most part immaturely developed and were yet regarded as a novelty. Notable exceptions were the trans-Mediterranean routes between Europe and Africa and those connecting North and South America.

It was in 1918 and 1919 that the first successful attempts to establish commercial air schedules were effected. At this time the first regular mail run in the United States was inaugurated between New York and Washington. For a short period flights were also operated between Seattle and Victoria and between Florida and Cuba—both international routes involving short water hops. In Europe during the same years Paris and Brussels, Vienna and Padua, and even Paris and London were connected by air lines.

From such sketchy starts as these there developed substantial networks of air routes which within the next ten or eleven years covered much of Europe and North America. For example, in 1929 key routes between major cities had been established thruout the United States. Most airlines, however, offered services principally between individual cities, ordinarily not more than a few hundred miles apart. Trans-continental schedules as we know them today did not exist. Also, airmail rather than passengers provided the main financial support of these early routes. In a few instances trunk routes were opened up in other continents. The best known were those thru the Caribbean region to South America and that skirting the southern fringe of Asia.

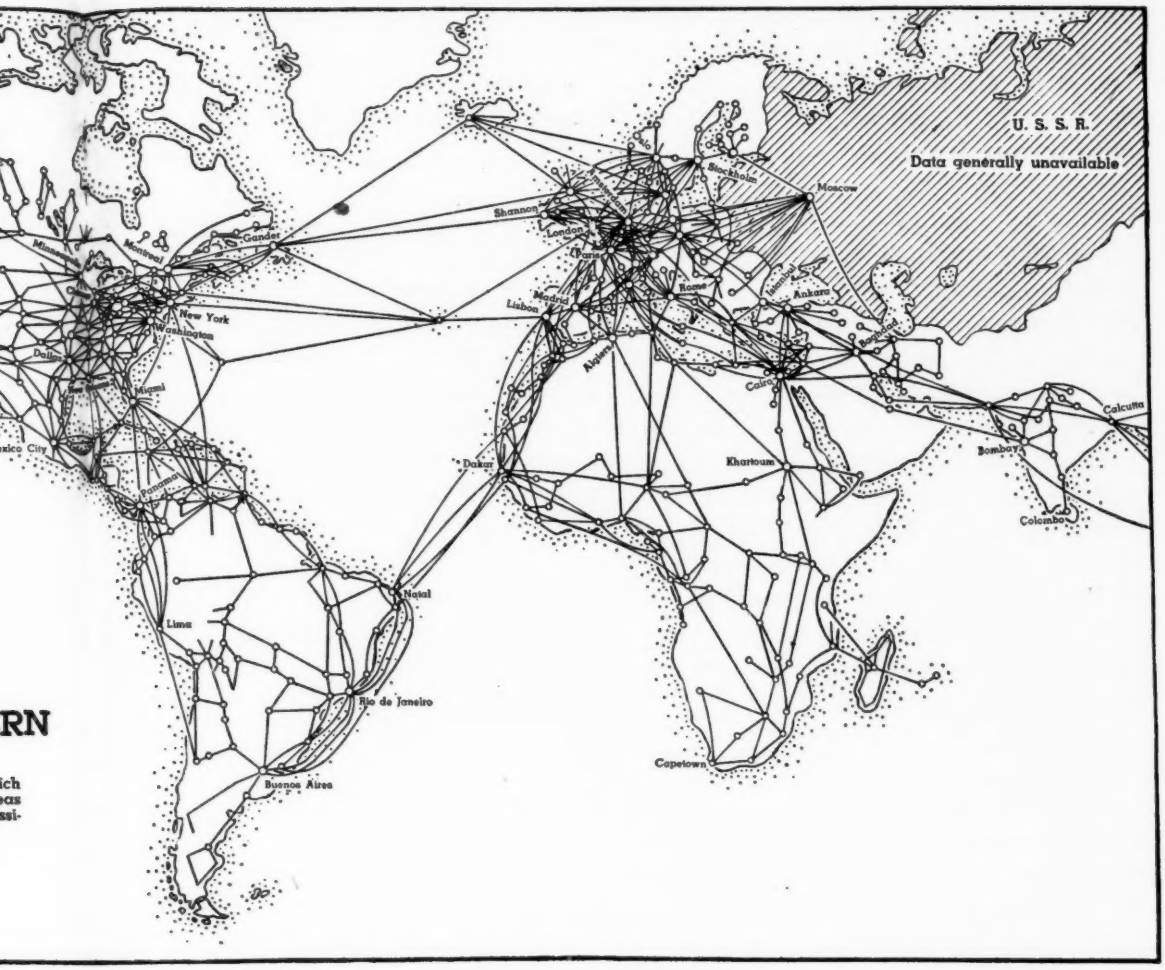
From 1929 until the outbreak of the war the expansion continued. Greatest development took place (1) in areas of dense industrial population and (2) where surface transportation was inadequate. Illustrating the first type was the United States, especially the eastern and midwestern sections, and most of Europe. Points like New York, Cleveland, Chicago, Atlanta, Kansas City, and Los Angeles in the United States, and London, Amsterdam, Paris, Berlin, Rome, and Stockholm in Europe were thriving air centers with routes radiating in many directions. Illustrating the second type were Alaska, Siberia, and the Pacific countries of South America. Nome and Fairbanks in Alaska were thirty days apart by dog team but only four hours by air. In the Andes the high plateau with its semi-isolated communities could have access to the Pacific



The accompanying map shows the general world air route pattern as it existed in the summer of 1947. In most instances the routes were plotted in accordance with schedules as of July, 1947. Where data for July schedules were not to be had the latest available were used.

On a map of this type it is virtually impossible to show precisely the exact itinerary of every air route, or to distinguish between airlines. In some areas, especially eastern United States and western Europe, the network of routes proved to be so dense that only trunk lines could be plotted, and even they had to be generalized. Moreover, where two or more air routes coincide between terminals only one line has been drawn. Likewise, schedules with a very low schedule frequency, as one or two round trips a month, were commonly omitted. In short, the map illustrates world coverage for the commercial air transportation industry without going into detail.

After only two years of peace, air routes span the world in an impressive fashion. Except for ice-bound Antarctica every continent has its own air network—not just transcontinental trunk routes, but entire networks! Both the Pacific and Atlantic oceans are traversed in several places, and smaller water bodies such as the Caribbean, the Mediterranean, and the Java seas are crisscrossed by routes. If one is at all familiar with



the map of the world it is easy to tell that a route follows the Amazon River almost all the way across South America; that the Sahara Desert is crossed in five places; and that air lines penetrate the interior of China farther than railroads ever did.

On the other hand there is no evidence of air lines utilizing "over-the-pole" routes as the shortest distance between points in North America and points in Eurasia. Some air age enthusiasts predicted that in the postwar world we would see planes take off from such cities as San Francisco, Kansas City, Chicago, and New York and fly over the Arctic region directly to Stockholm, Rome, Moscow, Istanbul, Bombay, or Chungking. Such routes would be shorter by hundreds or even thousands of miles. Despite great savings in distance, however, this type of commercial flying is still a long ways in the future. In order to maintain the maximum pay load an airline must stick as close to the big cities and dense populations as possible. For example, an international airline with a route from New York to Bombay would not get very far trying to load planes at the point of origin and flying them over the Polar region to Bombay as the first stop. It takes traffic termini like Paris, Rome, Cairo, and Dhahran to make such a route to Bombay pay. Therefore, it is liable to be a long time before intercontinental passengers can look down and see the North Pole on a journey from one side of the world to another.

and Caribbean ports in a matter of hours or even minutes. Despite these advances over the land areas of the world, intercontinental travel by air was limited by lack of aeronautical "know how" in flying great distances, by the cost factor, and also by political and military motives.

The Clipper Era

In the late 1930's over-ocean flying between the United States and the Eastern Hemisphere became the issue of the hour, and many plans were projected for trans-Atlantic and trans-Pacific routes. Actual development during these years, however, remained in the pioneering stage. Across the Pacific Pan American clipper ships began in 1935 to operate to Manila in the Philippine Islands (via Hawaii, Midway, Wake, and Guam), and two years later the route was extended to Macao and Hong Kong on the southern coast of China. In the Atlantic sector clipper ships started regular service over the southern route (via the Azores) in May and over the northern route (via Newfoundland) in July of 1939. It is interesting to note that these initial plans called for flying boats (Clippers) rather than land planes—not because they were superior for over-water flights, but in order to cater to public psychology.

The Colonial Era

Thruout the 1930's long distance air routes stemmed from Europe to points in Asia, Australia, Africa, and even South America. Except for the hop across the South Atlantic from the bulge of West Africa to Northeast Brazil, over-water flights on these routes were short. Nevertheless, the European airlines operating over such extensive routes were largerly governmental instruments, primarily interested in connecting mother country with colonial empire. Schedules were hardly to be called frequent and traffic ran light; if the pay-load were low the subsidy and prestige would be high.

British Imperial Airways extended to Africa, India, Australia, and the Far East, serving great British centers like Capetown, Calcutta, Singapore, Hong Kong, and Sydney. The latter terminal was not first served until 1934, and the flight to that point from London required eleven days. Night flying over long distances had not yet been inaugurated. The Dutch line KLM had as its major objective Batavia in the Netherlands East Indies, but its route ex-

tended on to Australia. Air France had routes extending southward to French colonial areas in Africa and an Asiatic route traversing thousands of miles to reach French Indo-China on the Pacific. After leaving their respective European capital cities the British, Dutch, and French airlines more or less paralleled each other on the Far Eastern runs. Altho the three lines were not competitive in a true sense of the word, KLM aircraft made the best time much to the annoyance of British colonial officials stationed in the Far East.

Without a colonial empire, prewar Germany thrust its Deutsche Luftshansa route southeastward to follow the old power drive from "Berlin-to-Baghdad" of railroad fame. Kabul, capital of Afghanistan, was the eastern terminus when World War II interrupted operations but progress was being made in continuing the airway on across Asia. Italy's Ala Littoria and the Japan Air Transport likewise pushed air routes toward military objectives. The latter had routes to Manchukuo, North China, and to several islands in the Pacific which played such an important part in the recent war. The former established routes which reached across the Mediterranean and thru Libya to Ethiopia. Needless to say, unauthorized civilian travel on these routes ran exceedingly light.

Altho these extensive patterns of colonial routes failed in any endeavor to earnestly promote commercial traffic in the areas which they served, they did lay the groundwork of a service to be much more effectively performed at a later date.

Wartime Interlude

With the outbreak of the war, plans for commercial aviation were severely disrupted. Civilian schedules bowed to wartime requirements, not only in combat zones, but wherever the tension of war held sway. In the United States the curtailment of service and a system of priorities were symbolic of how the airlines "went to war."

In spite of the forced retardation of purely commercial air transportation during the war, aircraft suitable for peacetime service received enormous benefit by the acceleration of technical improvements. It has been said that the war acted as a huge subsidy to aeronautical science by speeding up the development of increasingly superior planes and improved flying techniques. Sometime during the war period these advances probably changed the airplane from an instrument which had difficulty in paying its way to

one that, given the traffic, could unquestionably pay its way. Government subsidies to air transportation companies are much less of an issue now than they were before the war.

In order to transport military personnel and material many new routes were urgently needed during the war years. The Air Transport Command (ATC) of the United States and the British Overseas Airways Corporation (BOAC) of Britain expanded into a pair of air networks which covered a large portion of the globe and supplied allied military operations on all fronts. By installing flying facilities, airways were pushed across the Sahara Desert as the shortest route to the Near and Middle East which avoided actual combat zones. Most notable of all, the North Atlantic was whipped into an all-year airway which carried an amazing amount of wartime traffic by the British, the Canadians, and ourselves. Before the war, crossing the North Atlantic route in wintertime was considered a most hazardous venture. Wartime enthusiasm and reliance on air transportation has definitely had a carry over into the postwar period.

Postwar Pattern

Most of the principal routes of prewar days, except those of the defeated Axis countries, are again functioning. In some instances schedule frequencies are low, but new services are constantly being added. In addition to these old routes, however, new ones are springing into existence to produce a postwar pattern which is truly becoming global. Such routes are based largely on commercial needs, new techniques of operation, and an air-age consciousness. Most important, commercial routes have replaced the old political and military routes. Oceans are now crossed without difficulty, and in the new cycle of development the individual continental patterns are being tied together into a new global pattern. At the present time most of the world's major airlines measure their systems in thousands of miles in contrast to hundreds as was the case in the early 1930's. The accompanying map, together with the explanatory caption, attempts to present a picture of the widespread coverage of regularly scheduled commercial air transportation in mid-1947.

Present Day Global Flying

Perhaps the most striking example of recent developments in the global air pattern is the present status of the North Atlantic

route. Nine commercial airlines operate regular schedules over the trans-Atlantic routes as follows:

Airline	*Flights Per Week* (both directions)
Pan American	54
American Overseas	48
Trans World Airline	44
Trans Canada	14
Scandinavian Airlines	14
British Overseas	12
Air France	10
KLM (Dutch)	8
Sabena (Belgian)	4
TOTAL	208

In the preceding table the first three airlines are American, the next is Canadian, and the last five are European. All of the European companies are government-owned and government-operated, and each country has but one airline crossing the Atlantic in comparison to the three United States carriers regulated by the government but owned and operated by private enterprise.

The total of 208 flights per week across the North Atlantic means that there is a scheduled crossing in each direction about every hour and thirty-five minutes on the average. When tourist travel is resumed full scale, trans-Atlantic traffic will justify many additional flights. Several additional European airlines are also planning to extend their routes to the United States.

From England to the Middle and Far East, British Overseas Airline (formerly Imperial Airways) now operates 24 flights each week to Cairo, 12 each week to Calcutta, 7 to Singapore, and 6 to Sydney. Other European companies likewise have impressive services—a far cry from the sluggish schedules of prewar years.

Over the Pacific there are four daily flights from California to the Hawaiian Islands, while Pan American Airways and an Australian airline both cross the ocean between North America and Australia and New Zealand. Northwest Airlines started operating flights across the North Pacific this summer, and plans to link up with Trans World Airline to form a round-the-world route.

Air service between the United States and Latin America has recently been augmented. Air routes criss-cross the Caribbean in almost every direction, and touch at least the capital of every South American country. Whereas before World War II Pan American

Airways operated most of the schedules to this part of the world, other United States flag carriers and several Latin American ones are now in the picture. For example, six United States domestic airlines are presently authorized to serve Latin America. Air centers like Havana, San Juan, and Mexico are accessible from various of our southern air "gateway" cities.

New Travel Patterns

In some instances these new global routes are changing traditional lines of travel established by means of surface transportation. Geographic location plays a direct and precise role in modern air travel. In crossing the North Atlantic to Europe airliners can usually land their passengers and cargo directly in or near the point of ultimate destination, thus eliminating the transfer from ship to train at port cities. Long boat trips around the western bulge of Africa or thru the Suez Canal and Indian Ocean are no longer necessary to reach the southern part of that continent. Seattle is beginning to lose its status as our only "gateway" city to Alaska.

Up to the present time circling the globe by air was a feat for some special mission—an event which rated important newspaper or magazine space. Now it is available to anyone who has the price of a ticket.

Bases for Transportation by Air

Summing up the underlying factors which permit global flying, we find that airplanes can profitably inter-connect traffic generating areas—regardless of where they may be located on the face of the earth. South Africa, the Eastern Seaboard of the United States, Southern Scandinavia, Peninsular India, Coastal Alaska, Temperate South America, the Iberian Peninsula, and Central China are only a few examples of traffic generating areas where an exchange economy will be the means of promoting unlimited air transportation provided it is unhampered by needless governmental restrictions.

As a means of transportation the airplane can successfully compete in a world of competitive types of carriers because of its (1) great speed, (2) high frequency of schedules, and (3) directness of routes regardless of surface conditions. This last factor gives us the "ocean of the air" concept which makes any airport on the globe a terminal capable of directly engaging in world commerce.

RESPONSIBILITY OF THE GEOGRAPHY TEACHER IN THE UPPER GRADES

EDNA E. EISEN
Kent State University, Kent, Ohio

Dr. Studebaker's remark "apart from rather backward nations, we are more illiterate geographically than any civilized nation I know," is a challenge to all of us. It is *not* because it took a global war to make us familiar with such names as Guadalcanal, Rabaul, Leyte, and scores of others that he has charged us so severely for not meeting our responsibilities. No one is ignorant geographically just because he cannot name the 7,000 islands in the Philippines. We have failed because our teaching has not developed the abilities needed to understand this world of peoples and places. In his book, *Geography and the Social Sciences,* Dr. Isaiah Bowman has told us what geography is, what its contributions are to education, and, in this way, to the understanding of world problems. I shall not attempt to summarize his most able work here but shall speak of ways in which the upper grade teacher in the geography class may work toward these goals.

"This world is made up of regions and each region has its own personality, its own set of significant conditions." The teacher's responsibility is to direct pupils toward understanding how the people in each region are using their natural resources and coping with the problems of their environment. An added responsibility is to guide pupils to realize that each region is not suspended alone in space, but is part of a whole. An understanding of the relationship of regions to one another and to the whole is essential.

There is no set way to reach this goal, no sure formula that never fails to produce the desired result when all the ingredients, factors of the cultural and the natural environment have been synthesized, that is, mixed together. I might follow the recipe of a woman in our town who bakes superb angel food cake and I might fail to get the same result. However, if she gave me a few pointers and her recipe I'm sure I could produce a better cake than I could without her help. It is not my purpose here to go into a listing of the ingredients or into the directions for mixing the ingredients of a regional understanding as I would with a group of prospective teachers. I shall limit myself to discussion of three pointers which I believe may be helpful in obtaining a better result from geography

teaching-people who are geographically literate instead of illiterate.

The Importance of Change

Unlike the cake recipe, the ingredients that make up the personality of a region are not always the same, they are likely to change in one or more factors. Dr. Bowman says that geography invites exploration and this spirit of exploration needs to be carried into the class room. One of the fascinating things to the geographical explorer of a region is this element of change. To one who explored Brazil a few years ago the vast, practically untouched resources of iron ore and the lack of nearby deposits of good coking coal were part of the personality of Brazil. Today the explorer finds a large new iron and steel plant at Volta Redonda, about twenty-five miles out of Rio de Janeiro, using the ores from the area drained by the Rio Doce and Santa Catarina coal. Blast furnaces, coke ovens, open hearth furnaces, rolling mills, and other equipment are new features of the landscape that must be woven into the pattern or synthesized in understanding Brazil. This change in the personality of Brazil is significant. Another similarly striking example of change is found in the far West of our own country which, a few years ago, had few signs of heavy industry. How different the picture is today. Now, for example, the explorer in the Los Angeles area finds among vineyards, orange, and walnut groves a blast furnace utilizing iron ore from San Bernardino County, ninety coke ovens depending on Utah coal, six open hearth steel furnaces, and a rolling mill turning out plate for battle ships. These are but two of many such changes in regional personalities. It is one of the responsibilities of the upper grade teacher of geography to help pupils discover such changes as they explore the regions of the world and to give them an opportunity to examine what these changes mean, that is interpret and synthesize these new data into the regional complex.

Reality to Measurement

Geography includes measurement which is essential in the development of a regional understanding. Such measurement must be translated into landscape features if it is to function. Let us assume that a class is studying the iron and steel industry of northeastern United States. What does it mean to find that in a recent year 43,598,000 tons of iron ore were shipped to Lake Erie ports

from the Lake Superior district? Picture an average ore boat which hauls about 10,000 tons. It would require 4,360 such boats to carry all this ore, if each boat made just one trip, or 218 boats each making 20 trips during the season. Of the above mentioned tonnage 10,083,000 tons or approximately 1,000 ship loads were docked at Cleveland; 9,635,000 tons or 964 ship loads at Conneaut, and 6,573,000 tons or about 660 ship loads at Ashtabula. Picture the huge buckets picking up about five tons at a "mouthful" and dumping the ore into hopper cars each containing from 50 to 65 tons. It would take about 160,500 cars to move the ore from the Conneaut docks to mills in the Mahoning Valley, for example. This means 1,600 trains of 100 cars each or an average of four or five trains leaving Conneaut every day of the year. This accounts for the ore from only one port. What becomes of this vast amount of ore? Picture one large blast furnace in the Mahoning Valley. It uses 1,160 tons of ore daily to produce 600 tons of pig iron. Each furnace then is using approximately 20 carloads of ore daily. The 160,500 carloads from Conneaut could supply only 22 such furnaces for one year. Ohio with 104 furnaces and Pennsylvania with 200 furnaces alone need more than 2,500,000 carloads of ore. In the same way pupils should be guided to understand what it means when they discover that a blast furnace uses 580 tons of coke daily in producing the 600 tons of pig iron mentioned above. One ton of coal yields about three-fourths of a ton of coke so it requires 773 tons of coal to make 580 tons of coke. If a coal car carries 50 tons of coal this one blast furnace requires approximately 15 cars of coal each day or over 5,000 carloads a year. Think of the carloads of coal needed to supply the 104 furnaces of Ohio alone. Few perhaps realize the importance of an abundant supply of water used for cooling and washing away of dust. In one day a blast furnace uses 17,000 tons of water. This is equivalent to 4,080,000 gallons. (1 gallon of water = 8⅓ pounds. 2000 divided by 8⅓ = 240 gallons per ton). An average family might use 80,000 gallons of water annually, but one blast furnace requires daily as much as a 51 year supply for an average family. It is not to be inferred that pupils in the upper grades should memorize such figures as these but without the direction of the teacher in some such concrete translation the pupils are handicapped in studying about the iron and steel industry—to appreciate the problems of obtaining raw materials, the advantages of certain situations, and frequently many

local problems such as those confronting the people in the Mahoning Valley even at this very time. This is just one example of hundreds of the kind that upper grade teachers must help pupils visualize if the vagueness of ideas which now exist among our people is to be corrected. Make sure then that ideas of measurement as well as landscape features are real to pupils if they are to understand regions. This is the second of my pointers which will aid teachers meet their responsibilities.

Map Concepts

My third and last pointer or hint for a more successful synthesis has to do with the teacher's responsibility in the use of maps. This in itself is a topic I should like to talk on for a long time but will satisfy myself with a few items about which people are, in general, glaringly ignorant. It was no disgrace not to have known about Guadalcanal, Rabaul, Leyte, Echweiler, and scores of other places, but it was a disgrace not to have known how to use a map or globe to learn about them when they appeared in the news. Our newspaper maps are a big improvement on what they used to be, but they are far from excellent. Some carry no scale of miles and many no orientation lines. Our globes are of necessity of such a small scale that not all places are indicated on them. The newspaper map needs to be fitted into the globe for a realization of relative position and the meaning of that position. This is sometimes hard to do and for this reason (as well as for many other reasons) it is the responsibility of the teacher in the upper grades that pupils get the atlas habit. Then if they know how to locate a place given its latitude and longitude it is necessary that meaning is attached to that location. What does this involve? Is it sufficient to note that Cologne toward which our armies headed is on the Rhine? No, it is very significant that this great industrial city at the southern end of the great Ruhr area is on the west side of the Rhine and that the other Ruhr cities are across the river. Does the pupil see thru the symbols? What does the dot and its size mean, the lines for railroads converging there, the short lines for bridges across to the east bank ports? Of course, a picture used with the map will aid greatly in this task, but a picture alone cannot do the job. There is nothing in the picture itself that gives direction, just as there is nothing in the picture to accurately measure distance or to tell where the place is with reference to other places. So we ask next does the pupil have the habit of

using the scale of miles on the map to translate space into actual distance? Let us assume he is using the National Geographic map "Approaches to Germany" which is on a scale of 1:2,000,000 or about 32 miles to the inch and also includes a graphic scale. Does the pupil quickly measure the distance from Aachen to Cologne as about 40 miles and visualize that in terms of a known distance, such as the distance from Kent to the Statler Hotel in Cleveland? What does it mean to the pupil that the 50th parallel north crosses the 400 mile western front? Does he immediately realize that at Thanksgiving time day by day the daylight period is getting shorter and shorter and that at Christmas time the day will be only about eight hours long? What did this mean to our flyers whose raids were all carried out in the daylight period? Does the pupil read the longitude of the western front and realize that when it is 9:30 P.M. (E.S.T.) here on Monday it is already 2:30 A.M. Tuesday on the western front? (How surprised we all were when those experts on Information Please failed on these questions of longitude and time.) These are only a few of the map abilities the upper grade teacher ought to help her pupils to gain. I cannot stop without a few words concerning kinds of maps and what a map can and cannot do. The pupil must be shown that the globe is the only nearly true representation of the earth and that to measure air routes (particularly the shortest possible routes) the globe provides the only device by which he can get the distance in miles fairly accurately. Many globes have aids for doing this, but the pupil can stretch a string taut between two places, such as Seattle and Tokyo, see that the course bends far northward toward the Aleutian Islands, measure the distance either along the equator or along a meridian to get its length in degrees, and multiply by 70. No so-called global map (other than a gnomonic projection) gives the shortest distance by a straight line and even the gnomonic is difficult to use to get actual mileage. It is only on the globe or on an equal area projection that concepts of world distribution may be gained. In order to appreciate the vastness of the Pacific with its unnumbered islands, some of which are scattered hit and miss as tho thrown as pebbles into the air and then dropped where they would, no one would use a so-called new air age map. Even our muchly abused Mercator projection is far better since in low latitudes the distortion is at a minimum and directions are readily determined along straight lines. Certainly it is one of the responsibilities of the upper grade

teacher to know what the maps the pupils are using can and cannot do.

I have not spoken about the ingredients necessary to make a good cake or about the methods of mixing the specific ingredients but I have tried to show that if the regions of the world are to be understood by pupils in the upper grades, teachers must (1) have children explore regions always aware of the fact that there may be new things to discover even in an old region for changes are always occuring; (2) make real to the children all elements and especially those more abstract measurements that are part of the regional complex; and (3) let maps, the shorthand record of much that makes up the landscape, make their fullest contribution. It is as our pupils are able to apply to every day living the ability to think geographically that the American people will be equipped to meet the ever increasing problems at home and abroad.

TEACHING THE GEOGRAPHY OF AUSTRALIA THRU MAPS

J. H. Edwards
Johnstown, Pennsylvania

With the approach of mid-semester, I decided that I should like to have some really concrete evidence of the ability of the sixth grade classes to read various kinds of maps and to apply the larger types of generalizations which they had been learning to make for the past two and one-half years. Since the children's interests pointed to Australia, I chose that continent as the vehicle.

We began our work by using the various world maps in our text and on the wall, as well as the globe, to emphasize the isolation of Australia. At first, we studied its location generally, in the great expanse of water in the southern hemisphere, discussing its relation to the other continents. More specifically, we made use of our scale of miles, pieces of string, and pins to estimate distances from the closest and farthest continents. (That the children were impressed with the isolation of the island continent was apparent in a subsequent discussion, as they suggested that as one of the reasons for Australia's sparse population in comparison with that of their own country.)

Our next procedure was to study the economic map of Australia

in our text, noting particularly the exports and imports which are indicated along arrows. A casual examination of the lists on the board drew forth the obvious conclusion that the exports fell into the two categories of raw materials and foodstuffs, while the imports were the complementing manufactured goods, except, of course, lumber.

Listing first on the board the products "wool, sheepskins, meat," the children attempted to visualize this region from previous experiences, and arrived at the expected conclusions: dry region, sparse population. Checking the economic map again to locate the sheep-raising areas, they verified their conclusions on the rainfall and population maps. The vegetation map also corroborated their findings.

Taking next the export butter, the class recalled that dairy farming meant ample rainfall, cool weather, level land, and proximity to cities. Again they checked the economic map for possible location of dairy regions in Australia. Carefully spotting the cattle-producing areas on a simple outline map, they observed some locations that measured up to the qualifications they had set up, and others that failed to. Consternation set in, but only momentarily, for one alert young geographer reminded the group of the exports, cattle, hides, and meat, suggesting that beef cattle could be raised on drier lands, if they had plenty of grazing space. This took care of regions on the map marked "cattle" that happened to be sparsely populated and to have light rainfall.

As previous studies had emphasized the importance of wheat, or some substitute grain, the children were impressed that Australia had some to export. In setting up the natural conditions necessary for successful wheat production, they emphasized even terrain because of the use of machinery, large farms if the farmer was to realize a profit—therefore few people, and not too much rainfall. Their experience with the British homeland had taught them the disadvantage of too moist a climate for wheat. A check of the rainfall map led off on a sidetrack. They wanted to decide just why so many people lived along the eastern coast and so few in northern Australia. After a little discussion, the class decided that the temperate part of Australia would be more pleasant for people and, of course, the light rainfall of semiarid central Australia precluded any large number of residents there.

The minerals listed as exports—gold, silver, lead, zinc, and

coal—suggested rougher land. They were delighted to find the minerals in temperate Australia, since the people would feel much more like working in the middle latitudes. One youngster, apparently up on his current events, wondered whether there might be undiscovered mineral resources in tropical Australia.

This left us only fruits. Here the children used their indexes to find quickly what fruits were produced for export, and again called upon the maps to check on the natural conditions essential to producing bananas and pineapples in low-latitude Australia, apples, peaches, and pears in middle-latitude Australia, and sub-tropical citrus fruits somewhere in between.

Among the imports, machinery from Europe recalled the needs of the wheat farmers and miners of Australia, as well as the absence of any iron ore on the economic map. Recollecting England's attitude toward manufacturing in their own country when it was a part of the Empire, they decided that that might conceivably account for the importation of textiles and clothing. It was suggested that Australia might produce more of these products for itself as it grew in independence.

With an objective test to check on general understandings, and a picture test to check on visualization of concepts, I felt that we had little left to find out about Australia beyond filling in our skeleton outline and enriching our acquaintance with it.

TENTATIVE PROGRAM

ANNUAL MEETING OF THE NATIONAL COUNCIL OF GEOGRAPHY TEACHERS

University of Virginia, Charlottesville, December 27-30, 1947

A Symposium on the Functions of Geographic Instruction

Saturday, December 27

Morning. Registration

Noon. Luncheon meetings: Planning and Publications Committees; Gamma Theta Upsilon; others

2:00 P.M. General Session. A joint session of the National Council of Geography Teachers, the Association of American Geographers, the American Society of Professional Geographers, and the Virginia Geographical Society

Greetings

Welcome from the Virginia Geographers. Raus M. Hanson, President of the Virginia Geographical Society, Madison College, Harrisonburg, Virginia

Response. Alfred H. Meyer, President of the National Council, Valparaiso University

Introduction of the President of the University. Sidman P. Poole, Director of Virginia Geographical Institute, University of Virginia

Welcome from the University of Virginia. The Honorable Colgate W. Darden, President of the University of Virginia

A Welcome to Geographers. The Honorable Edward R. Stettinius, Rector of the University of Virginia

3:30 P.M. Sectional Meetings

Section 1: Geographic Instruction in the Elementary School

Chairman: Floyd F. Cunningham

Secretary: Cora P. Sletten

1. *Geographic Instruction in the Primary School.* Tom Barton, Indiana University
2. *The Vertical Articulation of Geographic Instruction.* Clyde Kohn, Northwestern University
3. *The Horizontal Articulation of Geographic Instruction.* Mamie Anderzhon, Irving School, Oak Park, Illinois
4. *Newer Emphases in Geographic Instruction.* Preston E. James, Syracuse University

Section 2: Geographic Instruction in the Secondary School

Chairman: C. E. Cooper

Secretary: Zoe A. Thralls

1. *The Geography of Nations.* H. O. Lathrop, Illinois State Normal University
2. *World Geography.* Henry Warman, Clark University
3. *The Treatment of Geographic Understandings in Integrated Social Studies Courses.* R. L. Tuthill, University of Kentucky
4. *The Treatment of Geography in History Courses.* Ralph H. Brown, University of Minnesota

Section 3: Geographic Instruction in the Undergraduate College Curriculum

Chairman: Loyal Durand, Jr.

Secretary: Elizabeth Eiselen

1. *Geography in the Teacher Education Program.* Alfred H. Meyer, Valparaiso University
2. *Geography in the General Education Program* (Survey, Orientation, Junior College, and Basic Programs). Nels A. Bengtson, University of Nebraska
3. *Geography in Inter-departmental Programs.* Stephen E. Jones, Yale University
4. *Geography for the Undergraduate Major.* Clifford M. Zierer, University of California
5. *Geography in Pre-Professional Curricula.* Eric H. Faigle, Syracuse University

Section 4: Geographic Instruction in the Graduate School (Joint session with ASPG)

Chairman: J. R. Whitaker

Secretary: Ina C. Robertson

1. *Geographic Training for the A.M. and Ph.D. in Geography.* Samuel Van Valkenburg, Clark University
2. *American Geographic Societies.* John K. Wright, American Geographical Society
3. *Organizing and Conducting Field Training in Geography.* G. Donald Hudson and Associates, Northwestern University

6:45 P.M. Annual Banquet and Reception for Past Presidents
(A joint banquet of the NCGT and ASPG)

The Purpose of Social Education. Edith P. Parker, University of Chicago

The Fulbright Act and Its Geographic Significance. Alfred H. Meyer, Valparaiso University

Sunday, December 28

Field trip, followed in the evening by a buffet supper for members of the NCGT, ASPG, and AAG.

Monday, December 29

9:00 A.M. Training Geographers for the National Defense Program
Joint meeting of the AAG, ASPG, and NCGT

11:00 A.M. General Assembly of the NCGT

1. Election of Officers
2. Project Committee Reports
3. Plans for NCGT
4. Publications of NCGT

12:30 P.M. Luncheon Meeting

National Council at Work, Coordinators, Associated and Affiliated Councils. Earl B. Shaw, presiding

2:30 P.M. Sectional Meetings

Section 1. Training Geographers for Professions Other Than Teaching

Chairman: George J. Miller

Secretary: John H. Garland

1. *Training Geographers for Business.* Eugene Van Cleef, Ohio State University
2. *Training Geographers for Transportation.* R. L. Tuthill, University of Kentucky
3. *Training Geographers for Planning.* Harold V. Miller, Tennessee State Planning Commission, Knoxville, Tennessee
4. *Training Geographers for Government Service.* To be announced.
5. *What are Foreign Countries Doing to Train Geographers for Professions Other Than Teaching?* Earl B. Shaw, State Teachers College, Worcester, Massachusetts

Section 2: Basic Skills in Geographic Instruction

Chairman: Tom Barton

Secretary: Raus M. Hanson

1. *Reading Geography.* Edna Eisen, Kent State University
2. *Developing Map Skills.* Katheryne T. Whittemore, State Teachers College, Buffalo, New York
3. *Using Still Pictures.* Melvina Svec, New York State College for Teachers, Oswego, New York
4. *Community Resources and the Geography Teacher.* J. G. Jensen, Oregon State College, Corvallis, Oregon

Tuesday, December 30

9:00 A.M. Meeting of the Executive Board

THE NATIONAL COUNCIL AT WORK

To function most effectively the Council must have a regional view of the specific geographic problems which concern the educational programs in the various sections of the United States. To help achieve this goal the new Constitution provides for a system of state coordinators. This system is designed to bring about as close a functional relationship as possible between the national organization and such state, regional, and local geography organizations as have become affiliated or associated with the National Council.

As noted in the By-Laws, state coordinators shall keep in touch with state educational plans and programs, assist those persons interested in the improvement of geography teaching, and watch for occasions upon which action might be taken to promote the standards of geography teacher training and certification at both the elementary and secondary school levels. The coordinators report annually to the Secretary of the Council.

State coordinators are elected by affiliated state clubs or councils to serve within their respective states. A local, regional, state, or interstate geography club or council may become associated with the National Council by a majority vote of the Executive Board, provided that its constitution and by-laws shall be in harmony with the constitution and by-laws of the National Council. Associated clubs or councils may become affiliated clubs or councils by a vote of the Executive Board provided that a third of its members are members of the National Council.

As of middle October, Secretary Kohn reported that five state, local, or regional councils had applied for affiliation and three for association. In addition seven states were in the process of applying for affiliation or association.

Each state may have but one coordinator. For such states which do not have affiliated state clubs or councils the Secretary may appoint a coordinator. The Secretary also serves as coordinator of the various associated and affiliated organizations and guides the state coordinators in their activities.

Coordinators elected thus far by State Councils

Illinois: H. O. Lathrop, Illinois Normal University, Normal
Kentucky: Richard Tuthill, University of Kentucky, Lexington
Wisconsin: Margaret Chew, State Teachers College, La Crosse
South Carolina: Julian Petty, University of South Carolina

Coordinators appointed thus far by Secretary Kohn, with the approval of the Board

Kansas: Anne M. Goebel, Kansas S.T.C., Emporia
Michigan: William Berry, Western Michigan College, Kalamazoo
New Jersey: Adelbert K. Botts, N.J. STC; Trenton
North Dakota: Ina C. Robertson; STC; Valley City
Oregon: J. Granville Jensen; Oregon St. Coll.; Corvallis
Virginia: Sidman P. Poole; Univ. of Va.; Charlottesville
Washington: Margaret T. Carstairs; Seattle
West Virginia: Roy T. Hickman; Concord Coll; Athens

Since the selection and the work of the coordinators are closely identified with the establishment and functioning of geography organizations thruout the states affiliated with the National Council, may we respectfully urge the creation of such organizations and their application to Secretary Kohn for affiliation or association with the National Council.

ALFRED H. MEYER, *President*

EDITORIAL NOTES AND NEWS

Soilless gardening is reported to be producing several million pounds of vegetables for American garrisons and occupation forces stationed in Japan and a few centers including Iwo Jima and Nanking, China. The vegetables raised are usually tomatoes, lettuce, cucumbers, green peppers, onions, and radishes. The largest of these hydroponic installations are in Japan. One near Tokyo covers fifty-five acres with five of these acres under glass, and another plot of twenty-five acres is near Kyoto. These installations are under the direction of an Air Quartermaster officer, Lt. Col. E. W. Elliott. The fresh vegetables are especially prized in areas where soil is lacking, or where unsanitary fertilization makes raw vegetable consumption unsafe. The plants may be grown in a water culture containing the basic plant needs, or they may be in gravel beds supplied with the proper fertilizer solution. In the large Army installations, long, shallow troughs are laid out parallel to each other on a slope. Each trough is a few feet wide and may be in sections to facilitate circulation. Between the troughs is space for the cultivators and harvesters. The vegetables are usually started in nurseries then set out in the gravel and at intervals the fertilizer solution is pumped into the trough followed by the proper drainage. The first of these Army hydroponic gardens was set up on Ascension Island, and was reported in the November, 1945, issue of the JOURNAL OF GEOGRAPHY, in Editorial Notes and News. This hydroponic project has been abandoned. Japanese scientists are eager to work in these gardens to learn how to increase Japan's food production. Special varieties of crops suited to soilless gardens are being developed by plant specialists.

DR. DAVID J. SWARTZ was recently made Administrative Assistant to the Superintendent of Schools, New York City. His present address is at the Board of Education of the City of New York, 110 Livingston St., Brooklyn 2, N.Y., Office of the Superintendent of Schools.

The California Council of Geography Teachers met last spring jointly with the Pacific Coast Geographers and elected the following officers: *President,* Dr. Walter Hacker, San Francisco State College; *Vice-president,* Arthur Carthew, Los Angeles City College; *Secretary,* Dr. Lauren C. Post, San Diego State College. *Councilors*: V. Calvon McKim, Fresno State College, Robert Brittingham, Ventura Junior College, Dr. John Kesseli, University of California.

The Department of Geography and Geology, Fresno State College, has added David C. Pontius and Chester F. Cole to the teaching staff to take care of an enrollment of seven hundred twenty-five students in the department.

We are pleased to announce that the United States Office of Education is planning to appoint someone to their staff as a "Specialist for Geography in Higher Education."

"The objective of the Specialist will be to promote and assist in the strengthening and improvement of curricular, teaching methods, and general educational programs of approximately 1700 colleges and universities of the nation engaged in the teaching of geography. The following are illustrative of the areas of information with which the Specialist will be concerned and are related to the aims and purposes of education in the arts and sciences, the content of instruction, the relations of liberal education in college to secondary education, courses of study, methods of teaching, the stimulation of improved instruction, and the relations of education in the arts and sciences to other phases and aspects of higher education: (a) the extent to which students in institutions of higher education now obtain instruction in geography; (b) the nature of the instruction in geography that is given in colleges and universities, and the emphasis that is given

to the various areas and regions of the world; (c) the contributions that the study of geography at the college level may make in preparing students for effective participation in the solution of the problems that face our democratic society; (d) the kinds of textbooks, visual aids, and other source materials available for and used in the teaching of geography at the college level; (e) the kind of content in geography that is most useful for the general education of students at the college level; (f) the needs of government agencies and other organizations for the services of specialists in geography; (g) curriculum organization for the preparation of specialists in geography; (h) the relationship between instruction in geography at the college level and at the level of the elementary and secondary school; (i) the characteristics of the faculty personnel engaged in the teaching of geography in colleges and universities.

"More specifically, the Specialist for Geography will be responsible for such activities as the following:

"Independently, or in cooperation with colleges and other organizations, planning and conducting studies and investigations of a professional and scholarly character with respect to the teaching of geography at the college level; analyzing and evaluating the results of original studies and investigations in the teaching of geography and preparing studies for publication; presenting the findings of the studies and investigations in addresses before both academic and non-academic groups.

"Establishing and maintaining cooperative working relationships with national, regional, and State organizations of scholars, staff members of the Office and other governmental agencies, lay organizations, and with the personnel of institutions of higher education whose work lies within the field of his professional interest.

"Stimulating and planning regional or national conferences for the consideration of problems arising with respect to special instructional aspects of geography.

"Promoting and stimulating cooperative experimental studies and demonstrations of improved practices in the teaching of geography in colleges and universities.

"Upon request, participating in surveys or evaluations of the programs of colleges and universities pertinent to the teaching of geography."

August 15 marked the transfer of sovereign powers from the British Crown to the two new Indian Dominions—the Hindu state of the Indian Union, and the Moslem state of Pakistan. The Indian Union is also known as Hindustan and some presses merely call it India. Both dominions are members of the British Commonwealth thru a common allegiance to the British Crown, but this may be severed at any time by either India or Pakistan. The King of England is no longer Emperor of India. British troops are being withdrawn as fast as shipping accommodations are provided, as Britain retains no defense base in either dominion. In addition to the two dominions there are the numerous states ruled by native princes. Some of these states will join one or the other dominion, but some may declare independence. Separation involves a great many problems, including those of defense forces; administrative personnel; partition of railway, telephone and telegraph systems; irrigation rights; electric power grids; national and provincial debts; apportioning of finscal assets and sterling balances in London; and the matter of setting up separate coinage. Then there will certainly be for a time a disruption of long established trade channels between the dominions, for much of what was formerly domestic trade now becomes foreign trade subject to controls and tariff barriers. The new frontiers separate parts that have very different natural resources. The Indian Union has not only the larger population, but it has the most mineral and capital resources, and the greatest industrial advancement. Tho the Indian Union is overwhelmingly agricultural in program, it will have a serious food deficit. Pakistan will be able to supply some of this food deficit, and some other agricultural products like cotton and jute needed to supply India's mills. If the two parts of Pakistan build up

an industrial pattern comparable to that of the Indian Union, each will need outside financial aid to develop this industry which in turn will need aid to develop the coal, petroleum, and water power resources of each part of Pakistan. Thus, the economic problems due to the partition are somewhat analogous to those confronting the nations that were set up following the carving of the Austro-Hungarian Empire. Well-being will depend in large part on the ability of those who develop the available resources of each part to the maximum advantage of the people.

The United States, Canada, and a number of western European countries are planning a series of weather-observation stations across the North Atlantic. Each station has two ships assigned to it. While one ship is on duty in the ocean location, the other is at its home port ready to relieve its sistership after a given interval of service. Each ship is equipped to take sea level observations as well as those aloft. This meteorological data will be sent to land bases and pooled with that sent from other land and sea bases. Each ship will provide navigational aids for aircraft and is also fitted to do rescue work. It will be easy to spot as it is to be painted yellow. The first of these weather ships was reported by the British to be stationed last August at a point 300 miles west of Ireland. Each ship will carry a crew of about fifty, including meteorologists, radio and radar technicians. If this initial step taken proves feasible, thirteen bases will be selected, with the United States probably outfitting ships for seven stations.

Brazil is preparing to double its electric power production in view of its expanding industries and its insufficient supply of domestic coal and petroleum. Its program is primarily under the auspices of the Federal and State Governments, aided by foreign capital which is given substantial investment guarantees. The most ambitious project calls for a series of dams on the Sao Francisco River, which is characterized by a series of rapids and falls. This project is to be patterned after our T.V.A. To that end, a number of Brazilian officials have been studying our power installations and power uses.

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Mr. Stevens is an instructor in geography at Oklahoma Agricultural and Mechanical College, and has been pursuing his studies for the doctorate at the University of Wisconsin.

Geographic Background of History in the Pacific Northwest. By Jessie L. Duboc 338

Miss Duboc was formerly State Supervisor of Schools in Helena, Montana. Later, she was Assistant Professor of Education at the State Normal College in Dillon, Montana. For two years she was chairman of the State Committee on Research in Geography. Miss Duboc has contributed numerous articles in five educational magazines. At present, she is engaged in personal research and writing in Billings, Montana.

American Thunderstorms. By Stephen S. Visher 348

Dr. Visher is Professor of Geography, Indiana University, and well known to JOURNAL readers for his frequent and helpful contributions.

How and When Does "Activity" Contribute to Social Education? By Mary Alice Mitchell 352

Miss Mitchell is Director of Elementary Education, Wilmington, Delaware, and a frequent contributor to educational magazines.

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